

### **REMARKS**

The foregoing amendments and these remarks are in response to the Office Action dated June 28, 2011. Applicant respectfully requests a three month extension of time and authorization is given to charge the appropriate fees to Deposit Account No. 50-0951.

At the time of the Office Action, claims 1, 2 and 4-6 were pending. Claims 7-14 were withdrawn in a previously issued Restriction Requirement. In the Office Action, objections were raised to claims 1, 2 and 4-6. Claims 1, 2 and 4-6 were rejected under 35 U.S.C. §112, first paragraph. Claims 1, 2 and 4-6 were rejected under 35 U.S.C. §103(a). The rejections are discussed in more detail below.

#### **I. Claim Objections**

Claims 1, 2 and 4-6 were objected to for the informality listed in the Office Action. An appropriate correction is made herein and withdrawal of the objection is respectfully requested.

#### **II. Rejections under 35 U.S.C. §112**

Claim 1, 2 and 4-6 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claim 1 presently recites "said gas flows being fed into said reactor in a predetermined feed direction substantially coaxial to a longitudinal axis of said reactor." The Office Action asserted that Figure 1 and page 6, lines 20-24 of the application disclose that the hydrocarbon gas feed is generally perpendicular to the longitudinal axis of the reactor. It is not understood why this rejection has been repeated in the present Office Action, as it was believed adequately dealt with in Applicant's prior response.

Applicant notes that Figure 1 shows an initial feed portion 19 which is coaxial with the longitudinal axis of the reactor, and in which the swirling device 12 is located. This finds support at least at page 5, line 24 through page 6, line 2, which states: "the catalytic secondary reforming

process comprises the feeding into reactor 1, with feed direction substantially parallel to the axis A-A thereof, of a first continuous gas flow comprising hydrocarbons and of a second continuous gas flow comprising oxygen. The latter has a feed direction substantially coaxial with respect to the axis A-A of the reactor 1." Additionally it is noted that page 6, lines 20-24 referenced in the Office Action refers to the initial duct C that carries the first gas flow to the reactor prior to its introduction into reactor in the interspace 9 in the first duct 8. The first duct 8 is coaxial with the second duct 7 (see page 6, lines 3-10), and the first gas flow is made to pass through distributor device 10 in order to obtain a uniform speed distribution within the interspace 9. Thus, after the first gas flow has been introduced into the feed portion 19, it flows in a feed direction coaxial to the longitudinal axis of the reactor within the duct 8 for a period of time prior to mixing, and then is mixed with the second gas flow as it is fed into the reactor when the second gas flow reaches the open end 18 of the duct 7 (see page 7, 10-18).

Furthermore, page 1 as originally filed recited at lines 11-13: "at least one of said gas flows being fed into said reactor in a predetermined feed direction substantially parallel, preferably coaxial, to a longitudinal axis of said reactor," (mirroring the wording of claim 1 as originally filed), and thus also supports the current version of claim 1. Accordingly, withdrawal of this rejection is again respectfully requested.

### **III. Rejections based upon art**

Claims 1, 2, and 4 were rejected under 35 U.S.C. §103(a) as being unpatentable over PCT Publication No. WO 2000/047517 to *Bedetti* (hereinafter "*Bedetti*") in view of U.S. Patent Publication No. 2003/0188486 to *Tanaka* (hereinafter "*Tanaka*"). Claims 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over *Bedetti* and *Tanaka* as applied to claims 2 and 1, respectively, and further in view of U.S. Patent Publication No. 2004/0047777 to Pettit

(hereafter "*Pettit*"). Applicant respectfully submits that the claims are patentable over these references.

With respect to *Bedetti*, it is noted that this document is already faced with the technical problem of effectively mixing the oxygen stream with the hydrocarbons stream in the combustion chamber so as to improve the combustion reaction upon mixing. *Bedetti* solves such a problem with the provision of a plurality of oxygen jets specifically generated in the reaction chamber so as to achieve such an improved mixing with the hydrocarbons (see for instance *Bedetti*, page 7, line 10 to page 8, line 4).

Starting from *Bedetti* as closest prior art, the skilled person would have had no incentive to totally dismantle the mixing method therein disclosed and replacing it with a fully different method, such as the swirling method as claimed in present claim 1. Indeed, the swirling method of claim 1 cannot be regarded as a mere adaptation of the mixing jets according to *Bedetti*.

It was not evident at the time of the invention that by replacing the mixing method of *Bedetti* with the claimed one a satisfactory result in terms of mixing would have been obtained. In the absence of any information in this regard, the skilled person would have had no expectation in this respect.

The same conclusion would have been obtained even if *Tanaka* is considered as relevant prior art. According to *Tanaka* (see for instance paragraph [0050]), it is the already formed fuel-air mixture which is passed through the orifice 14 and thus that is made to swirl in the premixing chamber 12.

To the contrary, according to the present claims the swirling motion is imparted only and exclusively to the single, separated flows of oxygen and hydrocarbon, respectively (or to only one of such flows), and not to an already formed mixture hydrocarbons-oxygen.

It is clear that the swirling method of the present claims is of a different type and cannot be compared or confused with the swirling generation taught in *Tanaka*. In adding *Tanaka* to *Bedetti*,

the skilled person might have provided a swirl generator downstream to the oxygen jets, i.e, after a mixture hydrocarbons-oxygen is formed, however he would have not subjected the separate flows to swirling before their mixture since the latter is not disclosed nor suggested by *Tanaka*. Therefore, even if *Tanaka* is added to *Bedetti*, a skilled person would not achieve that which is recited by the present claims.

Furthermore, it is noted that the process of *Tanaka* exclusively makes use of liquid hydrocarbons (see for instance paragraph [0020]), while *Bedetti* as well as the present claims are concerned with gaseous hydrocarbons. It follows that nothing can be derived or asserted from *Tanaka* about the practical feasibility and the expectation of success of replacing the mixing method of *Bedetti* (oxygen jets) with a mixing method based on the swirling motion.

Claim 1 is thus believed to be patentable over the cited prior art for at least the foregoing reasons. The dependent claims are also believed allowable because of their dependence upon an allowable base claim, and because of the further features recited.

**IV. Conclusion**

Applicant has made every effort to present claims which distinguish over the prior art, and it is thus believed that all claims are in condition for allowance. Nevertheless, Applicant invites the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Respectfully submitted,

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